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NO CLEAN CLEAR RESIDUE CORED SOLDER WIRES

Crystal™ 400, 500, 502, 505 & 511

Multicore Crystal solid fluxes for cored solder wires have been specially formulated to complement No Clean wave and reflow soldering processes. They are also applicable to repair operations carried out after a cleaning process, eliminating the need for further cleaning.

- Halide free version - Crystal 400
- RMA version - Crystal 500
- Fast soldering - range of activities to suit all applications
- Good spread on copper, brass and nickel
- Clear residues
- Heat stable - low spitting
- Mild odour

PRODUCT RANGE

Multicore Crystal 400 is designed for users who require a halide free formulation while Crystal 500 contains the low level of halide permitted in the obsolete RMA specification. The remaining products in the range contain higher halide levels to maximise soldering power.

Multicore Crystal 400, 500, 502, 505 and 511 cored wires are manufactured with a range of flux contents. Although users will normally be using products with a nominal flux content of 3%, the superior performance of the Crystal products may allow a lower flux content to be specified e.g. 2.2%. This will further improve residue appearance by reducing the quantity. All are available in alloys conforming to national and international standards, including lead free alloys. Some alloys and flux contents may be manufactured to special order.

RECOMMENDED OPERATING CONDITIONS

Soldering iron: Good results should be obtained using a range of tip temperatures. However, the optimum tip temperature and heat capacity required for a hand soldering process is a function of both soldering iron design and the nature of the task and care should be exercised to avoid unnecessarily high tip temperatures for excessive times. A high tip temperature will increase any tendency to flux spitting and it may produce some residue darkening.

The soldering iron tip should be properly tinned and this may be achieved using Multicore Crystal cored wire. Severely contaminated soldering iron tips should first be cleaned and pre-tinned using Multicore Tip Tinner/Cleaner TTC1, then wiped on a clean, damp sponge before re-tinning with Crystal cored wire.

Soldering process: Multicore Crystal flux cored wires contain a careful balance of resins and activators to provide clear residues, maximum activity and high residue reliability, without cleaning in most situations. To achieve the best results from Multicore Crystal solder wires, recommended working practices for hand soldering should be observed as follows:

- ★ Apply the soldering iron tip to the work surface, ensuring that it simultaneously contacts the base material and the component termination to heat both surfaces adequately. This process should only take a fraction of a second.
- ★ Apply Crystal flux cored solder wire to a part of the joint surface away from the soldering iron and allow to flow sufficiently to form a sound joint fillet - this should be virtually instantaneous. Do not apply excessive solder or heat to the joint as this may result in dull, gritty fillets and excessive or darkened flux residues.
- ★ Remove solder wire from the workpiece and then remove the iron tip.

The total process will be very rapid, depending upon thermal mass, tip temperature and configuration and the solderability of the surfaces to be joined.

Multicore Crystal flux cored solder wires provide fast soldering on copper and brass surfaces as well as solder coated materials. Activity of the halide activated versions on nickel is also good depending on the state of oxidation of the nickel finish. The good thermal stability of Crystal fluxes means they are also well suited to soldering applications requiring high melting temperature alloys.

The resin and flux systems are designed to leave relatively low residues and to minimise residual activity. This is achieved by ensuring some decomposition and volatilisation takes place during the soldering process. In some situations, this may generate visible fuming but in all cases, rosin fumes must be removed from the breathing zone of operators.

Cleaning: Multicore Crystal flux cored solder wires have been formulated to leave pale flux residues and to resist spitting and fuming. In most industrial and consumer electronics applications cleaning will not be required and

the product may therefore be used to complement a No Clean wave soldering or reflow process or to allow repairs to cleaned boards without the need for a second cleaning process. Should residue quantity be an important consideration, Multicore X39 flux cored wire may be specified if a halide free product is required or X52 if halide may be tolerated. Crystal 500, 502, 505 and 511 offer good activity and consequently cored wire flux contents and hence residue levels may be reduced in comparison with equivalent conventional products.

Should cleaning be required, this is best achieved using Multicore Prozone Solvent Cleaner (separate data sheet available). Other proprietary solvent or semi-aqueous processes may be suitable but saponification is not recommended.

TECHNICAL SPECIFICATION

A full description of test methods and detailed test results are available on request.

Alloys: The alloys used for Crystal cored solder wires conform to the purity requirements of the common national and international standards. A wide range of wire diameters is available manufactured to close dimensional tolerances.

Flux: Multicore Crystal solid fluxes are based on modified rosins and carefully selected activators. In use they exhibit a mild rosin odour and leave a small quantity of clear residue.

CRYSTAL FLUX PROPERTIES					
TEST	400	500	502	505	511
Acid Value, mg KOH/g	205-220	156-170	156-172	159-177	164-176
Halide content, %	Zero	0.04	0.2	0.5	1.1
J-STD-004 - solder spread (mm ²) - corrosion test	210 Pass	290 Pass	310 Pass	315 Pass	340 Pass
SIR Test (without cleaning) - IPC-SF-818 Class 3 - Bellcore TR-NWT-000078	Pass Pass	Pass Pass	Pass Pass	Pass Pass	Pass Pass
Electromigration Test (without cleaning) - Bellcore TR-NWT-000078	Pass	Pass	Pass	Pass	Pass
Classification - EN 29454-1 - J-STD-004 - IPC-SF-818	1.1.3 RO L0 LR3CN	1.1.2 RO L1 LR3CN	1.1.2 RO M1 MR3CN	1.1.2 RO M1 MR3CN	1.1.2 RO M1 MR3CN

Cored wire: Multicore Crystal cored solder wires are designed to give fast and sustained wetting on both copper and brass. This can be demonstrated using spreading tests on both substrates under standard conditions for the Multicore products and comparable competitor products. After 5 seconds, area of spread is measured to form a comparative index indicating total flux efficacy.

Multicore Crystal flux cored solder wires out-perform competitor products, which required a higher flux content and leave more residues whilst achieving poorer spread.

Relative wetting performance of Multicore Crystal and halide free competitor products *			
PRODUCT	FLUX CONTENT (%)	AREA OF SPREAD, mm ²	
		Oxidised copper	Oxidised brass
Crystal 400	2.2	222	209
Multicore 304	3.0	220	209
Competitor A	3.5	191	140
Competitor B	3.5	202	140

* - oxidised for 1 hour @ 205°C

Relative wetting performance of Multicore Crystal and RMA competitor products †			
PRODUCT	FLUX CONTENT (%)	AREA OF SPREAD, mm ²	
		Oxidised copper	Oxidised brass
Crystal 500	2.8	300	170
Multicore 381	2.9	195	110
Competitor C	2.4	150	85
Competitor D	3.1	240	120

† - oxidised for 1 hour @ 150°C

Relative wetting performance of Multicore Crystal and competitor products *				
PRODUCT	FLUX CONTENT (%)	HALIDE CONTENT (%)	AREA OF SPREAD, mm ²	
			Oxidised copper	Oxidised brass
Crystal 502	2.7	0.2	220	160
Competitor E	2.0	0.4	200	150
Competitor F	2.4	0.4	190	180
Competitor G	3.5	0.4	150	120
Competitor H	2.7	0.5	230	150
Crystal 505	2.7	0.5	220	240

* - oxidised for 1 hour @ 205°C

Relative wetting performance of Multicore Crystal and competitor products *				
PRODUCT	FLUX CONTENT (%)	HALIDE CONTENT (%)	AREA OF SPREAD, mm ²	
			Oxidised copper	Oxidised brass
Crystal 511	2.7	1.1	270	390
Competitor J	2.2	1.2	260	190
Competitor K	2.0	1.6	210	230

* - oxidised for 1 hour @ 205°C

HEALTH AND SAFETY

WARNING: The following information is for guidance only and users must refer to the Material Safety Data Sheets relevant to specific Multicore Crystal flux cored solder wires before use.

Fume Hazards and Precautions: Avoid excessive inhalation of the flux fumes. These are irritating to the throat and respiratory organs. Prolonged or repeated exposure may rarely result in sensitisation leading to occupational asthma. Suitable fume extraction equipment should be used to extract flux fumes away from operators.

Protection and Hygiene: Lead is harmful if absorbed into the body through the digestive system or skin. Eating, drinking and smoking should not be permitted in the working area. Hands should be washed with soap and warm water after handling solder, especially before eating.



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